

**Quiz #11; Tuesday, date: 04/10/2018**  
**MATH 53 Multivariable Calculus with Stankova**  
**Section #117; time: 5 – 6:30 pm**  
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**Student name:**

1. Evaluate the line integral  $\int_C \mathbf{F} \cdot d\mathbf{r}$ , where  $C$  is given by the vector function  $\mathbf{r}(t)$ .

$$\mathbf{F}(x, y, z) = -y\mathbf{i} + (x+y)\mathbf{j} - \frac{1}{2}(x^2+y^2)\mathbf{k}, \quad \mathbf{r} = \langle \cos t, \sin t, t \rangle, \quad 0 \leq t \leq 2\pi$$

2. *True / False?* If we overlay a sketch of the gradient vector field  $\nabla f$  and the contour map  $f$ , the arrows from the vector field will always be perpendicular to the contour lines.
3. *True / False?* Suppose  $f$  is a nonnegative function and  $C$  is the curve parametrized as

$$x = a + (b - a)t, \quad y = 0, \quad 0 \leq t \leq 1$$

Then  $\int_C f(x, y) ds \geq 0$  but  $\int_a^b f(x, y) dx$  maybe negative.